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ABSTRACT

Twenty children, one boy and one girl in each of ten second grade classrooms from four different experimental programs, were each observed over the course of a single school day. Each 30 second interval of approximately 80 hours of transcribed behavior stream observation was analyzed to determine whether the teacher, the learner, or the teacher and learner jointly controlled selected aspects of the activity, and to determine the learner's main or alternative task orientation. Relatively consistently controlled settings were observed for more time than inconsistently controlled settings in enrichment subject activity, but not in basic subject activity. Successively more inconsistent combinations of controls were associated with successively lower percentages of main task orientation in basic activity, but not in enrichment activity. Analysis of the discrepant cases shows that consistency of control between pacing and feedback from materials and/or peers was associated with relatively high engagement for both basic and enrichment activity. The research is linked to other research which has examined on-task behavior as both an index of the efficiency of an educational setting and a predictor of achievement in the setting. (Author)

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TASK ENGAGEMENT AND THE CONSISTENCY OF PEDAGOGICAL CONTROLS: AN ECOLOGICAL STUDY OF DIFFERENTLY STRUCTURED CLASSROOM SETTINGS

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Page 26 of "Task Engagement and the Consistency of Pedagogical Controls" should read as follows:

Table 9 shows that there fewer actual interactions between learners in the learner-pressed basic-activity settings coded teacher-controlled interaction (24% of these intervals contained subject-other learner interaction) than in those coded learner-controlled(32%) but that the former interactions were drastically low in task engagement (41%) and the latter were higher (71%).

The 29% printed instead of the 24% above was originally a typo that I then accepted in characterizing this as "only slightly" fewerthan the 32% of the contrasted settings. The stronger contrast of the correct percentages, 24 and 32%, is more consistent with the claim that there were different expectations for learner-learner interaction in these settings.

The data for the correction is available in Table 9, .24 being the result of dividing 374 into 90.

Jo Grannis

Every pedagogy is centrally concerned with the structuring of controls in the educational environment. Plato and A.S. Neill alike attended to who should have control over the subject matter of learning, the sequencing of studies, students' interactions with teachers and with one another, the materials of learning, the criteria of learning--in short, who should control the aims and conditions of education. A powerful approach to the study of educational environments should be one that looks systematically at different distributions of controls over the various elements of an educational environment, and that asks what consequences flow from these distributions.

The research this article will report focuses on the relationships between different combinations of teacher and learner controls and the learners' engagement in their principal activities. The dependent variable, "task engagement," is closely related to "on-task behavior," and thus links the research to a variety of past and current studies of the conditions affecting, and the significance of, learners' on-task behavior.

The research began as a descriptive study of learners' behavior in differently structured classrooms, specifically the second grade classrooms of several contrasting Project Follow Through models and a sponsor of classrooms outside of Follow Through. Its purpose was to identify patterns and degrees of "autonomy in learning." Behavior stream observations of children in the different classrooms were recorded and subsequently analyzed. The concepts of control and task engagement were not clearly defined at the outset, but

were gradually evolved from working back and forth between the data and theoretical considerations.

Operationalization of the concept of control

A basic assumption of this study is that the resemblances and differences between classrooms that the sponsors of the classrooms themselves appear to think are important are clues to the variables that are significant for the participants in the classrooms. The strategy is not simply a comparison of classroom models as such, but rather a use of them to highlight variables that should eventually prove to be as critical within the classrooms as between them.

At the most general level, control--the exercise of authority and direction by the teacher or the learner--manifestly concerns the sponsors of Follow Through classrooms.* Some emphasize the prescription of instruction for learners, while others stress learners' initiative and responsibility. A first problem, however, is that a dichotomous polarization of teacher and learner control might invalidly represent the models. Open educators talk about combining teachers' initiative with learners' initiative, and behavior modification educators discuss

* Project Follow Through is a set of federally funded intervention programs for children of low-income communities in grades K-3. In 1970, when this research began, there were some 25 different programs in Follow Through, each a K-3 "model" with an institutional sponsor. The "planned variation" of these models was meant to lend itself to comparative research. Maccoby and Zellner (27) interpret the rationale of the models; Rivlin and Timpane (33), McDaniels (28) and Grannis (17) interpret the evaluation research.

the learners' gaining control as a result of their mastering prescribed skills. It is necessary to define degrees of teacher or learner control, and to determine proportions of time that the learners in one or another classroom exercise different degrees of control (36).

A second problem is that different aspects of the classrooms seem to be connected to control, and that these aspects can vary independently. The variables that the present report will concentrate on are the activity options open to a learner at a given time, the pacing of the learner's activity, the feedback available to the learner from materials, and the expectations for interaction among learners. Other environmental variables that can vary independently include the initiation of an activity, its termination, the specification of the step-by-step operations of the activity, and evaluation of the end result of the activity.

Of the many sources consulted during the course of the research, Gump (19) and Bernstein (6) influenced most the resolution of these problems. Gump's analysis of classroom settings demonstrated the possibility of categorizing different macro-features of the context of a learner's behavior over brief time intervals. A teacher's or a learner's pacing of an activity, for example, might be accomplished through a variety of specific behaviors. "Pacing" is a general inference from these behaviors. Gump's strategy further entails coding the "standing" or expected-over-time features of a setting, so that

one would decide from the available cues whether a teacher or a learner was expected to pace the learner's activity, distinguishing this from whether in fact the learner's behavior conformed to this expectation at a given moment in time. Similarly, options, access to feedback from materials, and interaction between learners, could all be coded from the standpoint of the setting expectations for behavior.

Bernstein's concept of "framing" suggested that virtually any aspect of a pedagogical situation could be construed as subject to the teacher's or the learner's control, at least within the external constraints on the variability of the situation. If it is obvious that options, pacing, and interaction between learners are matters of control, the application of the concept to feedback from materials renders explicit what is only implied in some pedagogical rationales. The programming of instructional materials is indeed a deliberate mechanism of control, but the provision of manipulative materials that lend themselves to a variety of a learner's operations only implies, even in the statements of open educators, the assignment of control over feedback from materials.

The precipitate of all these considerations was a decision to categorize the options, pacing, materials feedback, and interaction between learners as controlled by the teacher, by the teacher and learner jointly, or by the learner, over successive brief intervals of the observation record of a child's behavior stream. This synthesizes the two major techniques of ecological

psychology, the behavior setting and behavior stream observations (4). The integration of these techniques with the control categories creates what might be called a "political ecology" of the educational environment.

The tri-parte distinction between teacher, joint teacher and learner, and learner control, is crucial to the resolution of the polarization problem. Consider options. Conceding that external factors limit options in any classroom, one can still distinguish between times when the teacher makes the choice of an activity and times when the learner chooses unconditionally. Between these extremes there is a region of limited or conditional choice: the learner may have been assigned several activities, but with choice over their order; there may be several specified activities from which the learner must and may choose; or the learner may choose when to engage in an activity that has a set completion time.

Next consider the pacing of a learner's activity, the regulation of the rate of information processing and energy expenditure. Again conceding external constraints, one can recognize time when a teacher is continuously present and making demands of some sort on the learner, time when the teacher regularly enters and leaves the phenomenal vicinity of the learner, and time when the teacher is essentially absent from the learner's vicinity.

The analysis of materials feedback is especially revealing in these terms. What is concerned is control over confirmation of the correctness of the learner's operations. Materials feedback appears to be controlled by the teacher if no materials are available to the learner or if the materials in use are symbolic

without explicit answers, for example, a worksheet posing problems but not providing answers and not coordinated with manipulative material that might supply confirmation to solutions of the problems. Materials feedback can be said to be jointly controlled when materials incorporate printed answers, for example, programmed workbooks with answers in the margin; or when there is material to copy, a comparison of the material to be copied with the product providing feedback to the learner; or when manipulative materials furnish answers to set questions, for example, Cuisenaire rods coordinated with a worksheet. In all these cases the learner has access to feedback without consulting the teacher, but the teacher has restricted the feedback that is available. The learner fully controls materials feedback when materials are available that confirm a variety of operations by the learner, for example, paints, building blocks, a hamster, a printing press, or Cuisenaire rods used in an exploratory activity.

The case of an expository book illustrates the strong ambiguity of some materials from the standpoint of feedback. While the book is, literally, symbolic material without explicit answers, it can contain little or much contextual feedback, depending on the reader's ability to extract feedback from the redundancy of the encoded information (35). In the present research "symbolic without explicit answers" was applied to book reading, but very few instances of reading books were actually observed. Many more instances of another, similarly ambiguous situation were encountered, the presentation of material

like a film or pictures held up in front of a group. These situations were omitted from the materials feedback control categorization.

The question of who controls interaction between learners also presents difficulties. The teacher can be regarded as controlling learners' interaction if the learners are prohibited from interacting with each other, during seatwork or during a recitation when the learners are expected to interact only with the teacher,or if the teacher completely regulates the learners' interaction, during a ceremony or mass choral recitation. The learners' interaction can be considered jointly controlled if the learners are allowed to interact, but the activity of each is to be completed individually. The learner has the greatest control,in this way of thinking, when differentiated interaction between learners is essential to the activity of two or more learners, for example in a construction project involving a division of labor, or when conversation is itself the learners' principcl activity.

An alternative, possibly more valid analysis, would define teacher control as above, but would define joint control in terms of rules that shape, but do not fully prescribe or proscribe learners' interactions, for example instructional games and formal peer tutoring. This scheme would define learner control as the possibility of a learner's interacting or not with other learners as he or she chooses. It is the first set of distinctions that has been used in the research this article presents.

As was stated at the beginning of this explication, the control of options, pacing, materials feedback, and interaction between learners can vary independently.

From very early in the research, however, the investigator sensed an overall tendency for these controls to vary together, and at the same time the occurrence of marked inconsistencies among the controls in certain situations. The analysis of the effects of different combinations of the controls, therefore, came to be defined as an examination of the consequences of consistency or inconsistency of the controls. Some of the ramifications of this will be outlined in a discussion of a theory of congruence following the presentation of the results of the analysis.

Task engagement as an outcome variable

The long range purpose of this research is to identify the pedagogical conditions that best foster learning and development. Research conducted during the several decades prior to Project Follow Through left undecided the question of how different controls affect achievement on written tests (13,26, 34, 39). This same research, however, suggested that more divergent achievement, and independent and cooperative behavior within the learning environment, were promoted by what one reviewer called "dispersion of the teacher's social power and emotional acceptance" (16). All of the Follow Through models were committed to enhancing children's achievement, and some were at least equally concerned with the broader, more developmentally construed range of educational goals. The greater variety of classroom environments in Follow Through than were available for previous research invited further advances on the problem.

The present research was designed to examine exclusively the learners' conduct of their classroom activity, focusing on this as both important in its own right and

essential to the pursuit of any goal. The investigators' specific interest in patterns of autonomy lay directly behind the decision to use behavior stream observation, that is, observation oriented to the immediately goal directed, intentional activity of the learner (41). Of course, virtually any behavior could be construed in the subsequent analysis as subsumed under goals at one hierarchical level or another. For the present purpose, however, it made sense to start with the goals that the participants in a classroom talked about as defining its principal activities, activities that might be assigned to a lear ner or that the learner might declare he or she elects. When this coordination was attempted, and the analysis attended to the initiation, termination, and suspension or interruption of these activities, a second, structurally inferior class of activities became apparent. Main activities usually began earlier, terminated later, and occupied more time than the alternative activities that permeated or interrupted them. As it turned out, the main activities of the children observed averaged approximately 15 minutes elapsed time, while the alternative activities averaged approximately 2 1/2 minutes elapsed time.

The category 'main task behavior' has been applied to all behavior that contributes to, or belongs to, the activities that are recognized as having priority in the observed learner's behavior stream record. This includes provisioning for the task, gaining perspective on the task by comparing progress with other learners, and seeking or giving directions for the task from or to another learner or the teacher, as well as carrying out the task in the most

direct sense. The category 'alternative task behavior' has been applied to all behavior that is competitive with main task behavior. It could be passive, as in waiting, resting, or gazing, or it could be directed more actively toward an alternative goal, for example the goal of helping another learner with his spelling, as an alternative to the learner's own arithmetic task. The latter example clearly indicates that alternative activity is not being construed in the same way that "off task" is often construed to mean activity not sanctioned by the teacher. While such a usage might be applicable to teacher controlled activities, it becomes invalid in those situations where the learner sanctions his own activity, having to regard only the most basic covenants of the learning environment. In the example above, spelling would become the learner's principal activity at the point when the learner terminated his arithmetic activity in favor of spelling. Up to this point, the designation of the spelling as an alternative activity is meant not to judge the spelling moralistically, but to be an index of the power of the arithmetic setting for sustaining the learner's engagement in arithmetic.

The concept of task engagement implies involvement. In a separate data collection conducted to pursue some of this project's questions at the time, Greene and Logan (18) coordinated ratings of learners' affective arousal, or involvement, with Mayer and Casey's (30) simultaneous observation of the same learners' interactions with the teacher, other learners, and materials, in classrooms of the three Follow Through programs represented in the research

being reported here.* The observations of the interactions included judgments as to whether the learners' behavior toward the teacher, other learners, and/or materials, were those expected in the setting--a standpoint very close to the main task/alternative task distinction of the present inquiry. It was found that involvement correlated positively with expected behavior in all of 9 basic types of classroom settings observed. Greene and Logan argued that expected or on-task activity is more likely to be involving than off-task activity because it is usually more developed, and that its development is a consequence of its considerably longer duration. This links task engagement with that affective interpretation of involvement that is generally assumed to be necessary for the accomplishment of developmental educational goals (21, 23).

From a learning standpoint, the significance of task engagement is similar to that presumed by all definitions of on-task behavior. Carroll's model of school learning defines as its central variable "time during which the person is oriented to the learning task and actively engaged in learning" (9). Bloom has operationalized this as "time on task," or the ratio of total active learning time to total allocated exposure time. Bloom reports that

> ...indices of the amount of time the student is spending directly on the learning (either overt or covert) are highly predictive of the learning achievement of the student. The correlations

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*Bank Street, University of Kansas, University of Oregon.
See below, p. 12 ff.

when corrected for reliability account for about three fifths of the achievement variation of students (7: 686).

In the present study the learners' task engagement under specified conditions of control is operationalized as the ratio of main task activity to main task activity and alternative task activity combined. The analysis yields a task engagement percentage for each of the combinations of controls examined.

Sample

Twenty children, one boy and one girl in each of 10 second grade classrooms, were each observed over the course of a single school day between February and June 1971. All of the classrooms had been recommended as valid exemplars of one or another educational program. Eight of the classrooms were involved in Project Follow Through, three of these sponsored by the University of Oregon (Siegfried Engelmann and Wesley Becker), three by Bank Street College of Education (Elizabeth Gilkeson), and two by the University of Kansas (Donald Bushell). Two classrooms were sponsored by the Creative Teaching Workshop (Floyd Page), at that time an agency of the Education Development Center outside the sphere of Follow Through. All 10 of the classrooms were located in predominantly low-income neighborhoods.

The Oregon program combines so-called traditional classroom methods with behavior modification practices. It emphasizes the learning of generalizable concepts and skills through a mixture of teacher-paced, programmed small group recitations, and learner-paced, in-class written assignments, the "take homes", so named because they are taken home after they have been successfully completed.

Much of the day is devoted to DISTAR reading, language, and arithmetic instruction, while the remainder of the day is determined by local curriculum priorities.

The Kansas program is characterized as "behavior analysis". Kansas stresses the learning of reading, handwriting and arithmetic concepts and skills, but through each child's progressing individually through programmed workbooks. It uses a reinforcement system in which the child receives tokens for approved performances and spends the tokens at least once a day on elected activities, typically construed by the children themselves as "play" in contrast to the "work" of the earn periods.

Bank Street offers a "cognitive-social development" or "interactive" program. The program is equally concerned with the intellectual, the social, and the esthetic development of the child. It relates not only formal instruction, but creative activity, conversation, and games (as does Oregon to a lesser extent) to the teaching of skills and concepts, sometimes through the use of integrative themes for the class's activities as a whole.

In theory, the Creative Teaching Workshop classrooms are more oriented to the individual child's exploration of an object-laden learning environment, by comparison with Bank Street's historical emphasis on the classroom as a miniature society. However, one of the C.T.W. teachers observed had been trained at Bank Street, and, conversely, Bank Street has been heavily influenced in recent years by the object orientation of the English infant school. The Creative Teaching Workshop explicitly identifies itself with open education.

This selection of programs was intended to provide a variety of presumably well functioning classroom environments, differing especially in the structuring of the learner's activity. Though the Creative Teaching Workshop classrooms contained just one teacher, supplemented briefly in one case by a student teacher, each of the Follow Through classrooms was staffed by two to four paid teachers and aides throughout the day; thus the study clearly does not purport to reflect the proportions of time children spend under different degrees of adult control in second grade classrooms generally. Most of the analysis asks what regularities occurred in association with specified degrees of teacher or learner control. For this purpose the selection appears to have been appropriate.

In each classroom the head teacher was asked to withdraw from a list of the children who might be observed individually any child who she thought should not, for a special reason such as the child's not speaking English, be observed. One boy and one girl were then chosen at random for the behavior stream observations. Parents' permissions for these observations had been obtained for all the children in advance of this selection. The children and teachers were not told what selection resulted, though they usually became aware of it by the end of a day's observation.

The children were all 7 or 8 years old at the time of the observation. Their reading ability appeared to range between struggling to decode second grade material and fluency with third grade material. The behavior stream

records demonstrate that, as with any 20 school children, their temperaments and learning styles varied considerably, within as well as across classrooms and programs. The regularity of their behavior as a function of setting should thus be all the more striking.

Procedure

The behavior stream observations of the children in a given classroom were conducted on one day during a week in which the research team also obtained a behavior stream observation of the head teacher, behavior setting observations of the classroom, and videotapes of selected settings in the classroom. In this way several sources of information could be brought to bear on the subsequent coding of the control conditions for the behavior streams.

A team of 5 or 6 observers conducted the behavior stream observations of the children, taking turns so that, except when observers were replacing one another, there were always two, but not more than two, observers in the classroom at a given time. The children were told that the observers would be talking into recorders in order to keep notes on the classroom. The children were asked to proceed with their usual day, and the observers then became as uninteresting as possible. Unsolicited comments by the teachers following the observations, and a subsequent analysis of the behavior stream transcripts for evidence of the children's watching the observers, established that the observations were satisfactorily unintrusive.

The behavior stream observation tapes for children were transcribed

into typescripts. A mechanism had been installed in each tape recorder to signal 60 second intervals to the typists. The first step in coding was subdividing these units into 30 second intervals by counting the typed lines for each minute and arbitrarily designating each half of them as 30 seconds. Since the procedure did not subsequently sample events at 30 second intervals, but rather coded events over 30 second intervals, it does not present any special problems for the analysis. A total of 9797 coded 30 second intervals resulted. The average number of minutes coded for a child was 245, or just over four hours observed time in the classroom. The longest time was almost six hours and the shortest slightly more than three.

A variety of codes derived from ecological psychology (3, 19, 41) and classroom interaction analysis (1,29) were applied to each 30 second interval of the transcripts. Of the categories that have been used in the present analysis, some remain in their original form, and others represent condensations of the categories first used.

The following are the categories employed in the present analysis:

Activity concern: basic subject (reading, writing, spelling, handwriting, oral language development, arithmetic); enrichment subject (science, social studies, art or crafts, cooking, music, show and tell, fantasy play, board games, object play, construction); environment maintenance (transition, physical exercise, eating, toileting, cleanup).

Options: teacher (closed); joint (partial); learner (open).

Pacing: teacher (teacher present in setting); joint (teacher regularly in and out); learner (teacher absent from setting).

Materials feedback: teacher (none); joint (restricted); learner (unrestricted).

Interaction between learners: teacher (prescribed or proscribed interaction); joint (separate tasks, interaction allowed); learner (co-operative task).

Task orientation: main task (dominant in behavior stream); alternative task (competitive in behavior stream).

Each coding judgment was based on the category that applied best to the majority of transcript lines in a 30 second interval. Task orientation, for example, was coded 'alternative task' only if more than half the lines represented alternative behavior.

The application of these codes every 30 seconds presents a special problem for the statistical analysis. The observations with respect to each variable are interdependent from one 30 second interval to the next throughout each activity, not simply as a function of coder judgment, but because these intervals were sequential in real time. This is most blatant in the case of options, which was determined from the circumstances at the initiation of an episode. Pacing, materials feedback, interaction between learners, and, of course, task orientation, could and did change within an activity, and changed independently of one another. But even these changes were recognized as occurring over phases of an activity or episode, not in 30 second intervals taken one at a time. Except for task orientation (or not in the same sense as follows) these codes all have to do with the conditions and expectations of and for the learner during his activity. From a statistical standpoint, the identification of persisting patterns in the learner's environment is equivalent to orienting to Markov chains in the data, and it enhances the possibility of prediction

in the same way that the identification of Markov chains increases this capability in interaction analysis generally (5). At the same time, the existence of the chains places restrictions on the statistical inferences that can be drawn in the type of analysis required to examine task engagement under different combinations of pedagogical conditions. The sheer percentages of time occupied in various ways have been resorted to to provide limited answers to the research questions. The only significance test used, Kendall's coefficient of rank correlation, makes no assumptions that are not met in the data.

Reliability

Observer reliability was only established informally during the investigators' training in behavior stream observations prior to the data collection. Kaminsky made an ex post facto study of the reliability of the teacher behavior stream observations by matching segments of the observation records against segments of videotape recordings that had been obtained at the same time. The content of the observation record was thus compared to the actual data which the tape provided.

> Prior to the comparison decisions were made as to the information which would be required for accurate analysis. Molecular behavior of the teacher, such as touching her hair, tapping a pencil, and other unconscious actions, were disregarded as irrelevant. For six observers a range of .83 to .93 agreement was obtained for at least one half hour of matched tape and observation record. In all cases where discrepancies occurred it was in omission rather than in misrepresentation (24: 87-88).

As it was more difficult to hear children's conversations in the classroom than teachers', it can only be presumed that the observer reliability for the

child behavior stream observations was somewhat lower than that for the teacher observations.

Coder reliability is reported here for the three coders who, between them, coded all the child behavior stream observation records. The procedure used to compute r took A's coding as criterial. One hundred and twenty (120) 30 second intervals of transcript, representing all four programs, were coded for this reliability test.

Variable	A/B	A/C
Options	.87	.86
Pacing	.97	1.00
Materials Responsiveness	.83	.97
Interaction between learners	.84	.67*
Activity concern	.82	1.00
Task orientation	.94	.93

RESULTS

1. Teaching-learning conditions observed in the four programs.

Table 1 shows that each of the five pedagogical variables discriminated in a meaningful way between programs. The small group recitations in the Oregon program are reflected in the exceptionally high proportion of time during which interaction between learners was totally prescribed, and

*This reliability was obtained before final coding commenced. The particularly low agreement between A and C for interaction between learners reflected C's different interpretation of the definitions of the categories, which were immediately resolved. The coders subsequently conferred on all difficult decisions throughout the several months of the coding.

Table 1

Percent of total time learners in each program were observed under each condition

Total number of 30 second intervals	Bk.St. 3431	C.T.W. 1744	Kan. 1615	Ore. 3007
1. Options				
T, Closed	40%	54%	88%	76%
J, Partial	11%	2%	6%	19%
L, Open	47%	41%	6%	5%
Not codable	2%	3%	0%	0%
2. Pacing				
T, Teacher present in setting	35%	37%	21%	51%
J, Teacher in and out	9%	11%	45%	7%
L, Teacher absent from setting	56%	52%	34%	42%
3. Materials feedback				
T, No feedback	48%	51%	47%	64%
J, Restricted feedback	5%	0%	21%	7%
L, Unrestricted feedback	24%	35%	11%	9%
Not applicable or not codable	23%	14%	21%	20%
4. Interaction between learners				
T, Prescribed or proscribed	31%	29%	21%	66%
J, Separate tasks, allowed	58%	55%	76%	33%
L, Co-operative task, essential	11%	16%	3%	1%
5. Activity concern				
Basic subject	46%	41%	65%	76%
Enrichment subject	41%	50%	23%	13%
Environment maintenance	13%	9%	12%	11%
6. Task orientation				
Main task activity	86%	84%	78%	86%
Alternative task activity	14%	16%	22%	14%

also in the Oregon teachers' pacing learners' activity and controlling materials feedback the highest percentage of time. The children's control over the order in which they completed their "take homes" is reflected in the substantial partial options percentage for the Oregon program.

An entire class changed workbook areas at the same time in the Kansas classrooms, the children rotating through the tables in a fixed order. Thus the children in the Kansas program spent the highest proportion of time under teacher controlled options, the exception to this being the time they were presented with a choice of activities during the "spend periods." Medium pacing and restricted feedback occurred the highest proportions of times in the Kansas classrooms, though not as strongly as might be expected. In one of the Kansas classrooms the teacher and her assistants tended to interact with single learners for several minutes at a time, so that the remaining learners were virtually left to pace themselves. In both of the Kansas classrooms the restricted feedback that was supposed to be available in programmed workbooks was not functioning, or had been removed, for part of the time observed.

The Bank Street and Creative Teaching Workshop classrooms were distinguished less from each other than from the Kansas and Oregon classrooms. The children observed in the first two programs spent higher proportions of time under the conditions of open options, learner pacing, unrestricted materials feedback, and co-operative interaction between learners. The Bank Street and Creative Teaching Workshop children spent less time in the basic

subject activities, reading, writing, spelling, language, and arithmetic, than the children in the Kansas and Oregon classrooms.

The overall sensitivity of the variables to distinctive features of the programs supports the validity of the observation and coding procedures.

The generally infrequent occurrence of jointly controlled pedagogical conditions should be noted.

The lower main task orientation, i.e., main task engagement percentage, for the Kansas children raises the question of whether the figure is peculiar to these children, or reflects a pattern that occurs across all the classrooms, but disproportionately in the Kansas classrooms.

2. Task engagement as a function of different combinations of controls.

These analyses include only basic subject and enrichment subject activities. 7272 30 second intervals of these activities, or 74% of the total volume of the coded child behavior stream transcripts, were coded teacher controlled, jointly controlled, or learner controlled, for each of the four pedagogical control variables.

Table 2 displays the task engagement percentages for each of the control variables and the activity concern variable when the remaining of these variables are held constant. It can be seen that there is no consistent trend from high to low task engagement through the successive categories of any of the control variables. The mean task engagement for enrichment activities is higher than for basic activities, 88% compared with 84%.

Table 2

Mean task engagment for each separate pedagogical condition

Control conditions:		T	J	L
Pacing	n	3043	967	3262
	e	91%	81%	82%
Options	n	4558	821	1893
	e	84%	83%	90%
Materials feedback	n	4745	730	1797
	e	84%	82%	90%
Interaction between learners	n	3226	3569	477
	e	89%	81%	92%
Activity concern:		B	E	
	n	4983	2289	
	e	84%	88%	
Grand mean:	n	7272		
	e	85%		

The analyses that vary the control categories are somewhat complicated, and will be presented in several stages to make their structure clearer.

Table 3 does not distinguish between basic and enrichment activities, and considers only three of the control variables. It shows the total number of 30 second intervals each combination of the options, pacing, and materials feedback categories was observed, and, where this total is more than 20 intervals, the percentage of the time that the learners exhibited main task engagement.* Here the possibility of an interaction among the control variables is apparent. Consider the four combinations that were observed

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Insert Table 3 about here

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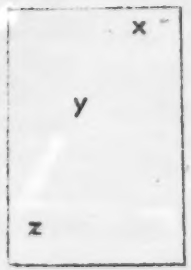
*In this and the subsequent tables the engagement percentages for combinations that have fewer than 20 observations are not displayed. These percentages are more erratic than those for the combinations that have more than 20 observations, and they confuse the patterns that can otherwise be discerned in the tables. Nonetheless, all the data are used in the consistency calculations that follow.

Table 3

Number of 30 second intervals and mean main task engagement for each combination of the controls of pacing, options, and materials feedback in basic and enrichment activities combined

	O_T			O_J			O_L		
	M_T	M_J	M_L	M_T	M_J	M_L	M_T	M_J	M_L
	0	1	2	1	2	3	2	3	4
P_T	2628	12	125	5		15	234		24
	.92		.76				.84		1.00
	2	1	2	1	0	1	2	1	2
P_J	404	210	107	13		60	17		156
	.70	.85	.96			.98			.86
	4	3	2	3	2	1	2	1	0
P_L	714	294	64	492	119	117	238	95	1129
	.65	.77	.98	.79	.81	.92	.94	.94	.90



x = degree of inconsistency

y = number of 30 second intervals observed

z = main task engagement, or main task over main task plus alternative task orientation

most frequently: $P_TO_TM_T$ (teacher pacing, teacher options, teacher materials feedback); $P_LO_LM_L$ (learner pacing, learner options, learner materials feedback); $P_LO_TM_T$ (learner pacing, teacher options, teacher materials feedback); and $P_LO_JM_T$ (Learner pacing, joint options, and teacher materials feedback). The task engagement percentages for these four combinations respectively are 92%, 90%, 65%, and 79%. What these data suggest is that the consistency with pacing of options and materials feedback affects the task engagement percentage.

To examine such an interaction further, an inconsistency formula has been devised. A value of 1 is assigned to the teacher category of each control variable, a value of 2 to the joint category, and a value of 3 to the learner category. The inconsistency of the control of options and materials feedback with the control of pacing is the sum of the absolute differences between the pacing value and each of the other two control values. For $P_TO_TM_T$ the inconsistency is 0, for $P_LO_LM_L$ it is 0, for $P_LO_TM_T$ the inconsistency is 4, and for $P_LO_JM_T$ it is 3. The inconsistency of each control combination, ranging from 0 to 4, is indicated in the upper right hand corner of the corresponding cell in Table 3.

The next step in this analysis is to obtain the mean engagement percentage for all the combinations of each inconsistency. For the three combinations with 0 inconsistency the mean task engagement is 91%. The eight combinations having an inconsistency of 1 have a mean task engagement of 90%. The mean engagement for the

combinations of inconsistency 2 is 83%. For inconsistency 3 it is 78%, and for inconsistency 4 it is 66%.

Tables 4 and 5 break down the data of Table 3 for basic and enrichment activities separately.

Insert Tables 4 and 5 about here

Applying the same calculations as before, quite different results are obtained for the different activity concerns. For basic activities, the trend discerned in Table 3 is strengthened. Combinations with inconsistency of 0 have 94% task engagement, those with inconsistency 1 have 88%, for inconsistency 2 task engagment is 81%, for 3 it is 78% and for 4 it is 64%. For enrichment activities, on the other hand, the trend dissipates. For the combinations of 0, 1, 2, and 4 degrees of inconsistency, the respective task engagements are 88%, 98%, 86%, and 91%. (Inconsistency 3 was observed for only 10 intervals.)

Table 6 summarizes these first three consistency calculations. Somewhat offsetting the discrepant findings above, Table 6 also

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Insert Table 6 about here

Table 4

Number of 30 second intervals and mean task engagement for each combination of the controls of pacing, options, and materials feedback in basic activities.

	O_T			O_J			O_L		
	M_T	M_J	M_L	M_T	M_J	M_L	M_T	M_J	M_L
	0	1	2	1	2	3	2	3	4
P_T	1989	12	93	2		8	147		1
	.94		.74				.91		
	2	1	2	1	0	1	2	1	2
P_J	400	210	5	3		2	17		37
	.70	.85							1.00
	4	3	2	3	2	1	2	1	0
P_L	691	294	3	489	119	64	215	95	87
	.64	.77		.79	.81	.88	.93	.94	.95

x
y
z

x = degree of inconsistency

y = number of 30 second intervals observed

z = main task engagement, or main task over main task plus alternative task orientation

Table 5

Number of 30 second intervals and mean task engagement for each combination of the controls of pacing, options, and materials feedback in enrichment activities.

	O_T			O_J			O_L		
	M_T	M_J	M_L	M_T	M_J	M_L	M_T	M_J	M_L
	0	1	2	1	2	3	2	3	4
P_T	639 .86		32 .81				87 .71		23 1.00
	2	1	2	1	0	1	2	1	2
P_J	4		102 .96	10		58 .98			119 .82
	4	3	2	3	2	1	2	1	0
P_L	23 .83		61 .98	3		53 .98	23 1.00		1042 .89

x
y
z

x = degree of inconsistency

y = number of 30 second intervals observed

z = main task engagement, or main task over main task plus alternative task orientation

Table 6

Summary of analysis of engagement percentages as a function of degrees of inconsistency in the control of pacing, options, and materials feedback.

	Inconsistency	Engagement	30 second Intervals	Percent of Time	Number of Cells	Intervals per Cell
Basic and Enrichment Activities Combined *	0	.91	3757	.52	3	1252
	1	.90	512	.07	8	64
	2	.83	1464	.20	10	146
	3	.78	801	.11	4	200
	4	.66	738	.10	2	369
Basic Activities *	0	.94	2076	.42	3	692
	1	.88	388	.08	8	46
	2	.81	1036	.21	10	104
	3	.78	791	.16	4	198
	4	.64	692	.14	2	346
Enrichment Activities	0	.88	1681	.73	3	560
	1	.98	124	.05	8	16
	2	.86	428	.19	10	43
	3	—	10	.00	4	3
	4	.91	46	.02	2	23

* To test the relationship between the predicted and the observed rank orders of the engagement, Kendall's coefficient of rank correlation has been computed. For both Basic and Enrichment Activities Combined and Basic Activities Separately, $\hat{\tau} = 1.00$, $p < .01$.

shows that the more consistent combinations were used a much greater proportion of the time in enrichment activities than in basic activities. Combinations with inconsistencies of 2,3, or 4 occurred only 21% of the total time enrichment activities were observed, whereas these combinations occurred 51% of the time basic activities were observed. This tendency for inconsistent settings to be found more in basic activities than in enrichment activities becomes still more apparent when the total observed time for each degree of inconsistency is divided by the number of combinations potentially contributing to this total time. Table 6 includes the results of these calculations. It can be seen that in enrichment activities the average time observed in the 3 combinations with inconsistency of 0 was at least 10 times as much as the average time in the combinations with any greater degree of inconsistency. By contrast, the average time in the basic activity combinations with inconsistency of 0 was only twice as much as the average in the basic activity combinations with an inconsistency of 4.

Indeed, the trend in the basic activities is for the average time in a combination to increase steadily from inconsistency 1 through inconsistency 4, so that a bi-modal distribution of average time obtains between combinations of inconsistency 0 and of inconsistency 4. No such tendency exists for the enrichment activities, and thus the tendency is only weakly present in the distribution of time for basic and enrichment activities together.

A closer inspection of Tables 4 and 5 elucidates these patterns still further. In the basic activities data the task engagement patterns are striking. There is a dramatic deterioration of task engagement as teacher control of options and materials feedback is maintained and the control of pacing shifts from the teacher, through joint control, to the learner. There is then a steady return to high engagement as options and materials feedback become more consistent with learner pacing. Inconsistency does not discriminate, however, among the several observed basic activities combinations that include fully learner controlled options. All of these have task engagements between 91% and 100%.

Almost all the enrichment activities observed occurred either in settings which had manipulative materials and were learner or jointly teacher-and-learner paced, or in settings which provided no materials feedback and were teacher paced. More generally for enrichment activities than in the case of basic activities, the consistency of options with materials feedback and pacing, as distinguished from the consistency between the latter two variables alone, appears to have made no difference to task engagement. The functioning of options will be taken up further following two other analyses.

Table 7 addresses the question of whether the patterns in basic activities obtain equally for all four programs observed. Where the number of 30 second intervals observed for a given program in a given

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Insert Table 7 about here

Table 7
Number of 30 second intervals and mean task engagement for each combination of the controls of pacing, options, and materials feedback in basic activities for the four programs separately.

	O_T				O_J				O_L			
	M_T		M_J	M_L	M_T	M_J	M_L		M_T	M_J	M_L	
P_T	488 .93	288 .94							119 .89	28 1.00		
	1143 .94	76 .93		92 .74								
P_J	20 .90	62 .45									36 1.00	
	25 .80	293 .73		208 .85								
P_L	139 .77	183 .62			141 .75	80 .71	26 .96		205 .93	91 .93	30 .97	
	165 .61	204 .60	161 .80	133 .72	341 .81	39 1.00	38 .82				47 .94	

Bks. CTW

Or. Kan.

combination was 20 or more, this number and the task engagement percentage are entered. The data for Bank Street, the Creative Teaching Workshop, Kansas, and Oregon, are entered in clockwise order beginning in the upper left hand corner of each cell in the table. It will be recalled that the children observed in the Kansas classrooms exhibited the lowest percentage of main task engagement of any of the children observed. From Table 7 it does not appear that there was a general tendency for the Kansas children to have been less engaged in the main tasks of equivalent settings. The Kansas children's main task engagement responded quite systematically to the variations in control that have been the focus of the analysis so far. Overall, the structure of the conditions, more than the particular subsets of children involved, seem to account more for the patterns in the data, although the many gaps in the data make this a highly tentative conclusion.

The last analysis examines the effects on task engagement of consistency or inconsistency among all four of the control variables, pacing, options, materials feedback, and interaction between learners.

There is not enough variation in learner interaction in the enrichment activities data to throw light on the problem, so only the data for basic activities will be presented. Table 8 displays the distributions of 30 second intervals and main task engagements for the dif-

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Insert Tables 8 and 9 about here

Table 8

Number of 30 second intervals and mean task engagement for each combination of the controls of pacing, options, materials feedback, and interaction between learners, in basic activities.

		O_T			O_J			O_L		
		M_T	M_J	M_L	M_T	M_J	M_L	M_T	M_J	M_L
P_T	I_T	0 1982 .94	1 12	2 92 .74	1	2	3 8	2 145 .92	3	4 1
	I_J	1 7	2	3	2 2	3	4	3 2	4	5
	I_L	2	3	4	3	4	5	4	5	6
P_J	I_T	3 73 .74	2 2	3 4	2	1	2	3 12	2	3
	I_J	2 327 .69	1 208 .85	2	1 3	0	1 2	2 2	1	2 37 1.00
	I_L	3	2	3 1	2	1	2	3 3	2	3
P_L	I_T	6 139 .61	5 63 .66	4	5 132 .73	4 4	3 24 .79	4 12	3	2
	I_J	5 494 .61	4 231 .79	3 3	4 357 .82	3 115 .80	2 40 .93	3 150 .93	2 46 .89	1 66 .94
	I_L	4 58 .98	3	2	3	2	1	2 53 .92	1 49 .98	0 21 1.00

Table 9

Analysis of engagement as a function of degrees of inconsistency in the control of pacing, options, materials feedback, and interaction between learners in basic activities. *

Inconsistency	Engagement	30 second intervals
0	.94	2003
1	.89	347
2	.80	746
3	.84	395
4	.83	663
5	.64	689
6	.61	139

* To test the relationship between the predicted and the observed rank orders of the engagement, Kendall's coefficient of rank correlation has been computed. $\tau = .81$, $p < .01$

ferent control combinations. Table 9 shows the mean main task engagement percentage for each degree of inconsistency between the control of pacing and the control of options, materials feedback, and interaction between learners. For inconsistencies of 0, 1, 2, 3, 4, 5, and 6 degrees respectively, the main task engagements are 94%, 89%, 80%, 84%, 83%, 64%, and 61%. Inspection of Table 8 reveals that the relative consistency with pacing of interaction between learners is found with higher engagement percentages in six of the nine comparisons that can be made between otherwise equivalent combinations.

The finding that control of options does not appear to interact with pacing to affect task engagement as strongly as do the other two control variables invites further probing of the data. It is possible to identify and inspect the behavior stream transcript material represented in each cell of one or another of the analyses. One of the combinations that is most discrepant from the general pattern for basic activities is $P_T O_L M_T$, for which the task engagement of 91% is unexpectedly high (Table 4). Four activities are found to account for most of the time in this cell. Two of them involved the girl and the boy in one of the classrooms, at a time when the teacher asked, "Which children need a math lesson in 10's?" Both subjects were among the 10 who volunteered, whereupon they participated in a lesson the teacher conducted at the blackboard. A third activity concerned a child who took a story she had written to the teacher, which the teacher then read and discussed with the child. And in the fourth episode, a learner went to the teacher to have the teacher

write down a story that he dictated to her, and the teacher then discussed the story with him. In all four of these cases, the learners seem to have exercised their options to satisfy a clearly defined need for instruction, help or feedback from the teacher. The teacher's response then took place under conditions that were coded as teacher controlled, though one might particularly question this in the case of the child dictating a story.

The enrichment activities in $P_JO_TM_L$ and $P_LO_TM_L$ (Table 5) appear to be reciprocals to the cases noticed above. In the cases now in question the tasks prescribed for the learners seem to have been activities that the learners would have elected for themselves. They include the following: two different instances of Show and Tell being prescribed for a class and the observed child's having brought an object which the child is taking around to classmates during the time represented; a cooking activity to which a child was assigned because it was her turn; a child's being assigned to work on a volcano construction and writing project that the child had already started as a free choice at an earlier time; a child's working on an ecology poster that was the only activity available for her at the time, but which she had shown various signs of anticipating while she completed her basic activities classwork for the day; and a child's participating in a sociodrama initiated by the teacher but very much controlled by the children in both content and process once the interaction had gotten underway. In all of these cases a teacher as-

signed a child to an activity in which the child controlled both the pacing and the materials feedback.

A different aspect of the functioning of options is illustrated by the basic activities in $P_L O_L M_T$ (Table 4), another combination for which the task engagement is higher than the inconsistency of the controls leads one to expect. It turns out that in every case the children defined the task in such a way that the observed child received substantial feedback from one or more other children, which feedback then made up for the lack of materials feedback. A child selected a story book, brought it to another child in the reading corner, and read it to that child. In another activity, the observed child and four others organized a spelling test at the blackboard; one child read the words, the subject and the three others wrote them on the board, and then the child with the book marked the spelling on the board right or wrong. Two children, one of them the observed, told their teacher, "We're going to write," and proceeded to write stories side by side, frequently looking at each other's writing as they progressed. Another two children decided to write a story about an airforce they had built, and proceeded to write in a manner similar to the children just described. Because of the separate tasks involved in the story writing episodes, they were coded "teacher and learner jointly controlled" interaction between learners. Nonetheless, they involved nearly as much interaction as the formally cooperative tasks in the first two episodes.

These cases contrast sharply with most of those in $P_L O_T M_T$ and in $P_J O_T M_T$ (Table 4). The activities of these latter combinations tended very heavily to be workbook and worksheet exercises, or paper and pencil tasks prescribed on the blackboard. Under these conditions the children in all of the programs except Bank Street rarely interacted over the content of their tasks, although they frequently compared what page or item they were on. The few exceptions to this included Bank Street children's consulting each other on their separate tasks, which explains the higher main task engagement percentages for Bank Street in the cells in question. Indeed, almost all cases of children resorting to each other for substantive feedback in basic activities were observed in the Bank Street classrooms, and thus appear to be deliberate implementations of the Bank Street model.

The significance of options has turned out to be more complex than the consistency question presumed. Either a teacher or a learner can exercise his option so as to orient an activity to the control of the other, as well as to obtain or secure control of feedback for himself. The teachers used their options more for basic than for enrichment activity. For the activities that they paced themselves they tended to maintain control over both materials feedback and interaction between learners. For the activities the teachers prescribed for learner pacing, however, they tended to provide or foster consistent materials feedback and learner interaction if the activity concern was an enrichment subject, but they varied considerably in the extent to which they established these conditions for basic sub-

ject activities. The task engagement differences between programs can be traced largely to these variations in teachers' provisions for prescribed learner paced activities. The learners tended to use their open options for enrichment activities, though they elected basic activities somewhat more in the Bank Street classrooms. Whether they chose basic or enrichment activities, however, the learners in all four programs tended to select, or form, appropriate materials feedback and/or learner interaction conditions under which to carry out the elected activity.

Discussion

The mean main task engagement percentage for all four programs observed, 85% for the 9797 recorded 30 second intervals, is higher than the on-task percentages, ranging between 70% and 80%, that have generally been reported in recent studies of classrooms that include substantial proportions of learner paced activity (8, 20). Perhaps the fact that the classrooms in the present study had all been recommended as exemplars of their models contributes to this difference, as well as the fact that there were probably more teachers in the present set of classrooms. As this study has demonstrated, however, the models themselves have much to do with the provision of appropriate conditions for the learners' activity. A first implication of this research is that the sheer percentages of time recorded as "on task" in classrooms labeled "traditional," "open," or whatever, are relatively meaningless without a specification of the conditions, espe-

cially for feedback from teachers, learners, and materials, under which the observed learners' time is spent (cf. 25).

A provocative finding is the relatively low proportions of time the children were observed under conditions jointly controlled by the teacher and the learner. Interaction between learners may appear to be an exception to this, but, except in the Bank Street classrooms, it seems to have been simply a neglected variable of learner paced activity in basic concerns; thus the frequent observation of learners' being "allowed" to interact over separate tasks usually reflected a situation in which the learners' interaction was tolerated up to a certain noise level, but was not encouraged within the frame of the task expectations. Each of the jointly controlled conditions, nonetheless, occurred as a deliberate feature of one or more of the programs. Bank Street fostered task-related interaction between learners; Oregon, and to a lesser extent Bank Street, created partial options; and Kansas employed both joint teacher-and-learner pacing and restricted materials feedback. What was lacking in all of the programs was the consistent combination of these jointly controlled conditions. The consistently jointly controlled setting, in fact, was never observed.

Much of the inconsistency in the basic activity settings relates to this infrequent, and irregular, occurrence of the jointly controlled conditions. The inconsistent settings that occurred most frequently appear to be the result of the teachers, or their sponsors, trying to articulate learner control with teacher control for instruction in

basic concerns, but in the process combining teacher control of some of the conditions with learner control of others, instead of designing settings that were controlled by both the teacher and the learner consistently among all the conditions. In an historical sense, the jointly controlled setting is only gradually being invented. Joint control between teacher and learner appears to have been crucial to Montessori's pedagogy (32). Glaser's recent formulation of an "adaptive" mode of instruction, in which both teacher and learner adapt to each other and the requirements of the task, explicitly includes joint teacher and learner control over all the conditions focused on in the present research (15). From a developmental perspective, joint teacher and learner control may have to be re-invented in every classroom to some degree. Developmentally, it may occur not as a step between teacher or learner control, but as a step beyond teacher or learner control, the resolution of a conflict for control. What one sees in classrooms that have not taken this step is a polarization of controls between the teacher and the learners.

At this point a deeper question looms large. Are any controls as appropriate as any other for the accomplishment of an educational aim, so long as the controls are consistent with one another? From early in the research the investigator caught glimmers of still more general patterns of consistency than those which the data analysis reported here is able to capture, consistency not only within the conditions of teaching-learning, but between these conditions and their intended outcomes. What now emerges is a general hypothesis that in

any educational situation, controls of process and controls of outcome will tend toward congruence. Different controls of the conditions of teaching and learning are hypothesized to be appropriate for different educational aims.

In an article written concurrently with the present article, we have analyzed not only pedagogical conditions, but the structures of different educational goals themselves, from the standpoint of control by other, by self, and by self and other jointly (17). Three classes of educational goals are recognized, goals of community, of individuation, and of competence. Community is held to entail the greatest degree of control by the collective other, individuation the strongest control by the self, and competence a joint control by a collective other and the self. In a developmental frame of reference, communities can be maintained and reconstructed more voluntarily by individuals who have developed high internal controls, individuation entails internalization of the community's controls, and competence increases as self and others join to stipulate what is to be controlled. The congruence hypothesis holds that, at different levels of individuals' and groups' development, the presence of a given constellation of environmental controls signals the general form of what is to be accomplished in an activity, as well as promotes its accomplishment through the regulation of control over pacing, feedback, evaluation of the end result of the activity, and other instrumental processes. A dynamic interplay or equilibration between the perception of the goal of an activity, and the control

of the conditions of the activity, is thus a part of what is implied by the hypothesis that controls of process and controls of outcome will tend toward congruence. A congruence of process and outcome in an educational setting results when the participant consistently takes his criteria for thought and action from self, other, or self and other jointly.

The occurrence of alternative or off-task activity can be interpreted in the framework of the congruence hypothesis. In so doing, however, one wants to recognize the positive function that learning theorists have variously ascribed to incongruence or discrepancy (11, 22, 31). Let us stipulate a distinction between 'incongruence' and 'discrepancy,' reserving the first term for the structural inconsistencies this argument has been addressed to so far, and using 'discrepancy' to refer to the difference between a perceived present state and an expected or intended state. The reduction of discrepancy in this sense is essential to the accomplishment of a task. The congruence hypothesis implies that this descrepancy reduction, and its attendant learning, occurs most efficiently and validly when control of the processes and the perceived outcome of the activity are consistent. Increasingly as the setting processes and goals, one could say the means and ends, are experienced by an individual as incongruent with one another, the individual disengages from thought-action directed toward reducing the discrepancy between present and intended state, and shifts toward reducing, or escaping from, the setting incongruence per se. Where the individual has full control

over options, this can take the form of redefining the main task. If the individual does not have this control, he will orient to an alternative task or object that is more compatible with those conditions that the individual does or can control. This interpretation of alternative activity appears to be fully consistent with the data of the present study.

A particular irony of the findings of this research is the conjunction of the nonoccurrence of consistently jointly controlled settings with the high occurrence of settings concerned with the basic subjects of language arts and arithmetic. A large proportion of the instruction in these subjects focused on concepts and skills that are central to competence, which the congruence hypothesis predicts would be most validly, as well as efficiently, achieved under conditions of joint teacher and learner control. The hypothesis receives a modicum of indirect support from the fact that almost all of the instances of joint control of one or another condition were observed in conjunction with instruction that focused on concepts and skills. The joint controls occurred mainly in basic subject activities, but they were also observed in enrichment activities. What the sponsors have created separately they have not yet put together. The implication is that any and all of the programs observed could enhance concept and skill achievement, in basic and enrichment activity alike, by integrating the sponsors' joint control procedures.

The main task engagement percentages are themselves, of course, not sufficient to predict achievement of one kind or another. Indeed, in Follow Through the sheer amount of time that children have been observed in basic activity has been the best single predictor of basic achievement test scores (37, 38), and the order of the three Follow Through programs in our own data on the proportions of time given to basic activity, Oregon, Kansas, Bank Street, is the same order that these programs have regularly occupied in the national evaluations. All of the relevant Follow Through research, however, has been able to predict achievement more accurately by including, along with time spent, variables that can be related to the control conditions of the present study. The most powerful approach appears to be that which Cooley and Emrick (10) have developed to operationalize the Carroll model. The two basic classes of events in this formulation are time spent on tasks related to the criteria sample and efficiency of the instructional environment. The thrust of the present research is that task engagement is a function of the efficiency of the instructional environment. By multiplying the percentage of total time that the children in each Follow Through program were observed in basic activity, by the mean percentage of this time that the children in the respective programs were actually engaged in this activity, the resulting order in the data of the present study is still Oregon, Kansas, and Bank Street.

It would be fruitful to follow the present study with a set of more experimental investigations. By systematically varying the control of options, pacing, materials feedback, interaction between learners, other process variables, and the goals of teaching-learning, one could obtain data on those combinations of conditions that are more scarce in found settings. Doke and Risley's (12) study of the effects of different combinations of teacher or learner initiation of activity with plentifulness or scarcity of learning materials, Fisher et al.'s (14) research on the effects of allowing learners to choose the difficulty levels of arithmetic problems in a computer assisted instruction setting, Wang's (40) study of the effects of learners' choosing the time of day in which to pursue prescribed tasks, and the mastery learning experiments of Bloom and his students (7, 2), all illustrate experimental approaches that the present line of investigation could pursue. All of these studies have used learners' on-task behavior as a proximal outcome variable.

Ecological observations must not be abandoned in following a more experimental course. At the least, the experiments would have to be maintained long enough to see both the more adaptive and the more stereotyped behavior patterns that appear to have developed in the classrooms of the present study some time after the instructional conditions were first established. More generally, ecological observation is as much concerned with the unintended as with the intended results of intervention. Task engagement presumably predicts much more than achievement on tests. The findings of the present study suggest

that the unintended results of different distributions of pedagogical controls have just barely been uncovered.

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